AMENDMENTS TO THE CLAIMS

1. (Previously presented) A color pixel cell for an imaging device, said color pixel cell comprising:

a first, second and third doped regions of a first conductivity type formed in a substrate, at least one of said first, second and third doped regions having a substantially different depth in said substrate from another doped region and being displaced laterally relative to said another doped region such that at least said one doped region does not overlap with said another doped region;

a first, second and third photosensitive regions formed in said respective first, second and third doped regions for receiving first, second and third photocharges corresponding to a particular color wavelength; and

a first, second and third floating diffusion regions of a second conductivity type formed in said respective first, second and third doped regions for receiving said respective photocharges transferred from said respective first, second and third photosensitive regions.

2. (Original) The color pixel of claim 1 wherein at least two of said first, second, and third doped regions have a substantially different depth from each other.

3. (Original) The color pixel of claim 1 wherein all three of said first, second, and third doped regions have a substantially different depth from each other.

4. (Original) The color pixel cell of claim 1, wherein said first doped region, said first photosensitive region and said first floating diffusion region correspond to a red sensor cell of said imaging device.

5. (Original) The color pixel cell of claim 1 wherein at least one of said first, second, and third doped regions is a retrograde well.

6. (Original) The color pixel cell of claim 1 wherein at least two of said first, second, and third doped regions is a retrograde well.

7. (Original) The color pixel cell of claim 1 wherein said first, second, and third doped regions are for collecting charges for red, blue and green wavelengths respectively and said first and third doped regions are retrograde wells.

8. (Original) The color pixel cell of claim 7 wherein said second doped region is a non-retrograde well.

9. (Original) The color pixel cell of claim 7 wherein the doping concentration at the surface of said first doped region is within the range of about 5×10^{14} to 1×10^{18} atoms per cm3.

10. (Original) The color pixel cell of claim 9 wherein the doping concentration at the surface of said first doped region is within the range of about 1×10^{16} to about 1×10^{17} atoms per cm3.

11. (Original) The color pixel cell of claim 10 wherein the doping concentration at the surface of said first doped region is about 4×10^{16} atoms per cm3.

12. (Original) The color pixel cell of claim 7 wherein the doping concentration at the bottom of said first doped region is within a range of about 1×10^{16} to about 2×10^{18} atoms per cm3.

13. (Original) The color pixel cell of claim 12 wherein the doping concentration at the bottom of said first doped region is within the range of about 2×10^{16} to about 1×10^{18} atoms per cm3.

14. (Original) The color pixel cell of claim 13 wherein the doping concentration at the bottom of said first doped region is about 1×10^{17} atoms per cm3.

15. (Original) The color pixel cell of claim 7 wherein the doping concentration at the surface of the second doped region is within the range of about 5×10^{18} to about 1×10^{18} atoms per cm3.

16. (Original) The color pixel cell of claim 15 wherein the doping concentration at the surface of said second doped region is within the range of about 1×10^{16} to about 1×10^{17} atoms per cm3.

17. (Original) The color pixel cell of claim 16 wherein the doping concentration at the surface of said second doped region is about 4×10^{16} atoms per cm3.

18. (Original) The color pixel cell of claim 7 wherein the doping concentration at the surface of said third doped region is within the range of about 5×10^{14} to about 1×10^{18} atoms per cm3.

19. (Original) The color pixel cell of claim 18 wherein the doping concentration at the surface of said third doped region is within the range of about 1×10^{16} to about 1×10^{17} atoms per cm3.

20. (Original) The color pixel cell of claim 19 wherein the doping concentration at the surface of said third doped region is about 4×10^{16} atoms per cm3.

21. (Original) The color pixel cell of claim 20 wherein the doping concentration at the bottom of said third doped region is within a range of about 1×10^{16} to about 2×10^{18} atoms per cm3.

22. (Original) The color pixel cell of claim 21 wherein the doping concentration at the bottom of said third doped region is within the range of about 2×10^{16} to about 1×10^{18} atoms per cm3.

23. (Original) The color pixel cell of claim 22 wherein the doping concentration at the bottom of said third doped region is about 1×10^{17} atoms per cm3.

24. (Original) The color pixel cell of claim 1, wherein said second doped region, said second photosensitive region and said second floating diffusion region correspond to a blue sensor cell of said imaging device.

25. (Original) The color pixel cell of claim 1, wherein said third doped region, said third photosensitive region and said third floating diffusion region correspond to a green sensor cell of said imaging device.

26. (Original) The color pixel cell of claim 1, wherein said first conductivity type is p-type, and said second conductivity type is n-type.

27. (Original) The color pixel cell of claim 26, wherein said first doped region is for a red sensor cell and is a deep retrograde well of a first depth.

28. (Original) The color pixel cell of claim 27, wherein said second doped region is for a blue sensor cell and is a shallow well of a second depth.

29. (Original) The color pixel cell of claim 28, wherein said third doped region is for a green sensor cell and is a shallow retrograde well of a third depth.

30. (Original) The color pixel cell of claim 29, wherein said first depth is substantially greater than said second depth.

31. (Original) The color pixel cell of claim 30, wherein said first depth is substantially greater than said third depth.

32. (Original) The color pixel cell of claim 31, wherein said third depth is substantially greater than said second depth.

33. (Original) The color pixel cell of claim 1, wherein said first conductivity type is n-type, and said second conductivity type is p-type.

34. (Original) The color pixel cell of claim 1, wherein each of said respective first, second and third photosensitive regions further comprises a respective photosensor for controlling the collection of charges in said photosensitive region.

35. (Original) The color pixel cell of claim 34, wherein each of said photosensor is a photodiode sensor.

36. (Original) The color pixel cell of claim 34, wherein each of said photosensor is a photogate sensor.

37. (Original) The color pixel cell of clam 34, wherein each of said photosensor is a photoconductor sensor.

38. (Previously presented) A color pixel cell for an imaging device, said color pixel cell comprising:

a red pixel cell, a blue pixel cell and a green pixel cell, each comprising a respective first, second and third multiple graded wells of a first conductivity type formed in a substrate, said first, second and third multiple graded wells having substantially different depths in said substrate and being displaced laterally such that said graded wells do not overlap;

a photosensor formed in each one of said first, second and third multiple graded wells for sensing respective red, blue and green color wavelengths;

a reset transistor having a gate stack formed in each one of said first, second and third multiple graded wells;

a floating diffusion region of a second conductivity type formed in each one of said first, second and third multiple graded wells between said photosensor and said reset transistor for receiving charges from said photosensor, said reset transistor operating to periodically reset a charge level of said floating diffusion region; and

an output transistor having a gate electrically connected to said floating diffusion region.

39. (Original) The color pixel cell of claim 38, wherein said first multiple graded well is a deep retrograde well of a first depth.

40. (Original) The color pixel cell of claim 39, wherein said deep retrograde well is a deep retrograde p-well.

41. (Original) The color pixel cell of claim 39, wherein said second multiple graded well is a shallow well of a second depth.

42. (Original) The color pixel cell of claim 38, wherein said shallow well is a shallow p-well.

43. (Original) The color pixel cell of claim 38, wherein said third multiple graded well is a shallow retrograde well of a third depth.

44. (Original) The color pixel cell of claim 40, wherein said shallow retrograde well is a shallow retrograde p-well.

45. (Original) The color pixel cell of claim 40, wherein said first, second, and third multiple graded well are at respective first, second and third depths and said first depth is substantially greater than said second and third depths.

46. (Original) The color pixel cell of claim 45, wherein said third depth is substantially greater than said second depth.

47. (Original) The color pixel cell of claim 38, wherein said photosensor further comprises a doped region of a second conductivity type located in each one of said first, second and third multiple graded wells.

48. (Original) The color pixel cell of claim 47, wherein said photosensor is a photodiode sensor.

49. (Original) The color pixel cell of claim 47, wherein said photosensor is a photoconductor sensor.

50. (Original) The color pixel cell of claim 38, further comprising a transfer gate located between said photosensor and said floating diffusion region in each of said wells.

51. (Original) The color pixel cell of claim 47, wherein said photosensor is a photogate sensor.

52. (Original) The color pixel cell of claim 38, wherein said first conductivity type is p-type, and said second conductivity type is n-type.

53. (Original) The color pixel cell of claim 38, wherein said first conductivity type is n-type, and said second conductivity type is p-type.

54. (Previously presented) A CMOS imager comprising:

a substrate having a first, second and third multiple graded wells of a first conductivity type, said first, second and third multiple graded wells having substantially different depths in said substrate and being displaced laterally such that said multiple graded wells do not overlap, and wherein each of said first, second and third multiple

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graded wells has a respective photosensor formed therein for sensing respective red, blue and green color wavelengths;

an array of pixel sensor cells formed in said first, second and third multiple graded wells; and

a circuit electrically connected to receive and process output signals from said array.

55. (Original) The CMOS imager of claim 54, wherein said first multiple graded well is a deep retrograde well having a first depth.

56. (Original) The CMOS imager of claim 55, wherein said deep retrograde well is a deep retrograde p-well.

57. (Original) The CMOS imager of claim 55, wherein said second multiple graded well is a shallow well having a second depth.

58. (Original) The CMOS imager of claim 54, wherein said shallow well is a shallow p-well.

59. (Original) The CMOS imager of claim 57, wherein said third multiple graded well is a shallow retrograde well having a third depth.

60. (Original) The CMOS imager of claim 59, wherein said shallow retrograde well is a shallow retrograde p-well.

61. (Original) The CMOS imager of claim 59, wherein said first depth is substantially greater than said second and third depths, and said third depth is substantially greater than said second depth.

62. (Original) The CMOS imager of claim 54, wherein each pixel sensor cell comprises a floating diffusion region of a second conductivity type located in each of said first, second and third multiple graded wells.

63. (Original) The CMOS imager of claim 62, wherein said first conductivity type is p-type, and said second conductivity type is n-type.

64. (Original) The CMOS imager of claim 62, wherein said first conductivity type is n-type, and said second conductivity type is p-type.

65. (Original) The CMOS imager of claim 62, wherein each pixel sensor cell further comprises a transfer gate located between said photosensor and said floating diffusion region.

66. (Original) The CMOS imager of claim 55, wherein said photosensor is a photogate sensor.

67. (Original) The CMOS imager of claim 55, wherein said photosensor is a photodiode sensor.

68. (Original) The CMOS imager of claim 55, wherein said photosensor is a photoconductor sensor.

69. (Previously presented) An imager comprising:

an array of color pixel cells formed in a substrate having at least one deep retrograde well of a first conductivity type, at least one shallow well of said first conductivity type, and at least one shallow retrograde well of said first conductivity type, wherein each pixel sensor cell has a photosensor for sensing a respective particular color wavelength, and wherein said deep retrograde well, said shallow well and said shallow retrograde well have substantially different depths and are displaced laterally such that said wells do not overlap;

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a circuit formed in the substrate and electrically connected to the array for receiving and processing signals representing an image output by the array and for providing output data representing the image; and

a processor for receiving and processing data representing the image.

70. (Original) The imager of claim 69, wherein said array, said circuit, and said processor are formed on a single substrate.

71. (Original) The imager of claim 69, wherein said array and said circuit are formed on a first substrate, and said processor is formed on a second substrate.

72. (Original) The imager of claim 69, wherein said at least one deep retrograde well has a depth substantially greater than the depths of said at least one shallow well and said at least one shallow retrograde well.

73. (Original) The imager of claim 69, wherein each pixel sensor cell further comprises a floating diffusion region of a second conductivity type located in each one of said at least one deep retrograde well, at least one shallow well and at least one shallow retrograde well.

74. (Original) The imager of claim 73, wherein said first conductivity type is p-type, and said second conductivity type is n-type.

75. (Original) The imager of claim 73, wherein said first conductivity type is n-type, and said second conductivity type is p-type.

76. (Original) The imager of claim 73, wherein each pixel sensor cell further comprises a transfer gate located between said photosensor and said floating diffusion region.

77. (Original) The imager of claim 76, wherein said photosensor is a photogate sensor.

78. (Original) The imager of claim 76, wherein said photosensor is a photodiode sensor.

79. (Original) The imager of claim 76, wherein said photosensor is a photoconductor sensor.

Claims 80-112 (Cancelled).

113. (Previously presented) A color pixel cell for an imaging device, said color pixel cell comprising:

at least two doped regions of a first conductivity type formed in a substrate, said at least two doped regions having substantially different depths in said substrate and being displaced laterally such that said doped regions do not overlap;

at least two photosensitive regions respectively formed in said at least two doped regions for respectively receiving photocharges corresponding to a particular color wavelength; and

at least two floating diffusion regions of a second conductivity type formed in said respective at least two doped regions for receiving said respective photocharges transferred from said respective at least two photosensitive regions.

114. (Original) The color pixel cell of claim 113, wherein each of said at least two doped regions, of said at least two photosensitive regions and of said at least two floating diffusion regions correspond to a particular color sensor cell of said imaging device.

115. (Original) The color pixel cell of claim 113, wherein said first conductivity type is p-type, and said second conductivity type is n-type.

116. (Original) The color pixel cell of claim 113, wherein said first conductivity type is n-type, and said second conductivity type is p-type.

117. (Original) The color pixel cell of claim 113, wherein one of said at least two doped regions is a deep retrograde well.

118. (Original) The color pixel cell of claim 113, wherein one of said at least two doped regions is a shallow well.

119. (Original) The color pixel cell of claim 113, wherein one of said at least two doped regions is a shallow retrograde well.

120. (Original) The color pixel cell of claim 113, wherein each of said respective at least two photosensitive regions further comprises a respective photosensor for controlling the collection of charges in said photosensitive region.

121. (Original) The color pixel cell of claim 120, wherein each of said photosensor is a photodiode sensor.

122. (Original) The color pixel cell of claim 120, wherein each of said photosensor is a photogate sensor.

123. (Original) The color pixel cell of clam 120, wherein each of said photosensor is a photoconductor sensor.

124. (Currently amended) A color imaging sensor comprising:

a substrate having a first defined region for sensing a first color wavelength component;

a second defined region for sensing a second color wavelength component; ~~and~~

a third defined region for sensing a third color wavelength component, wherein the lower boundaries of each of said first, second and third defined regions are located at respective different depths from a surface of said substrate and are displaced laterally such that said defined regions do not overlap, and wherein at least one of said regions is a retrograde well doped to a first conductivity type; and

a photosensor formed in each one of said first, second and third defined regions.

125. (Previously presented) The color imaging sensor of claim 124, wherein the lower boundary of each of said first, second and third defined regions corresponds to the depth of penetration of a respective color wavelength component into said substrate.

126. (Previously presented) The color imaging sensor of claim 125, wherein said first, second and third color wavelength components are red, blue and green, respectively.

127. (Previously presented) The color imaging sensor of claim 125, wherein at least two of said first, second and third defined regions have a substantially different depth from each other.

128. (Previously presented) The color imaging sensor of claim 125, wherein all three of said first, second and third defined regions have a substantially different depth from each other.

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129. (Previously presented) The color imaging sensor of claim 128, wherein said first depth is substantially greater than said second depth.

130. (Previously presented) The color imaging sensor of claim 128, wherein said first depth is substantially greater than said third depth.

131. (Previously presented) The color imaging sensor of claim 128, wherein said third depth is substantially greater than said second depth.

Claims 132-140 (Cancelled).

141. (Previously presented) The color pixel cell of claim 1, wherein at least two of said first second, and third doped regions are separated by an isolation region.

142. (Previously presented) The color pixel of claim 1, wherein said first, second, and third doped regions are each separated by an isolation region.

143. (Previously presented) The color pixel cell of claim 38, wherein at least two of said first second, and third multiple graded wells are separated by an isolation region.

144. (Previously presented) The color pixel cell of claim 38, wherein said first second, and third multiple graded wells are each separated by an isolation region.

145. (Previously presented) The CMOS imager of claim 54, wherein at least two of said first second, and third multiple graded wells are separated by an isolation region.

146. (Previously presented) The CMOS imager of claim 54, wherein said first second, and third multiple graded wells are each separated by an isolation region.

147. (Previously presented) The imager of claim 69, wherein at least two of said deep retrograde well, shallow well, and shallow retrograde well are separated by an isolation region.

148. (Previously presented) The imager of claim 69, wherein said deep retrograde well, shallow well, and shallow retrograde well are each separated by an isolation region.

149. (Previously presented) The color pixel cell of claim 113, wherein at least two of said first second, and third doped regions are separated by an isolation region.

150. (Previously presented) The color pixel cell of claim 113, wherein said first, second, and third doped regions are each separated by an isolation region.

151. (Previously presented) The color imaging sensor of claim 124, wherein at least two of said first, second, and third defined regions are separated by an isolation region.

152. (Previously presented) The color imaging sensor of claim 124, wherein said first, second, and third defined regions are each separated by an isolation region.